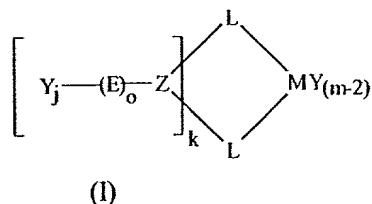


CLAIMS

1. A metallocene catalyst component for olefin polymerization comprising a metallocene compound characterized by the following formula:

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wherein:

Y is halogen;

M is a transition metal of groups 3-6 of the periodic table;

each L is independently selected from a cyclopentadienyl-type unity, including indenyl or fluorenyl, substituted or not and the substituents being equal or different, united to M through a  $\pi$  bond;

Z is a group that forms a union bridge between the two unities L, which can have between 0 and 20 carbon atoms and between 0 and 5 oxygen, sulfur, nitrogen, phosphorus, silicon, germanium, tin or boron atoms;

E is a spacer group that unites Z and Y and can have between 0 and 20 carbon atoms and between 0 and 5 oxygen, sulfur, nitrogen, phosphorus, silicon, germanium, tin or boron atoms.

It is characterized for having in its skeleton at least one silicon, germanium or tin atom, which the substituent Y is united to;

o is a number of value 0 or 1;

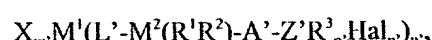
k is a number of value 1, 2 or 3;

m is a number equal to or higher than 2 and coinciding with the oxidation state of the transition metal;

j is a number of value 0 or 1 with the condition that its value is 1 at least once; when j is 1 and o is 0, Z is characterized by having at least one silicon, germanium or tin atom which Y is directly united to;

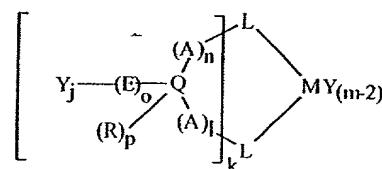
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with the proviso that the compound does not have general formula



wherein  $M^1$  is a metal of group 4, 5 or 6 of the periodic table, each  $X$  is independently selected from hydrogen, halogen or a  $C_1$ - $C_{40}$  carbon-containing rest;  $m'$  is equal to 1, 2 or 3;  $n'$  is equal to 1 or 2; each  $L'$  is independently a  $\pi$  ligand, which coordinates to the central atom  $M^1$ ; each  $M^2$  is independently selected from silicon, germanium or tin;  $R^1$  is a  $C_1$ - $C_{20}$  carbon-containing group;  $R^2$  is a  $C_1$ - $C_{20}$  carbon-containing group or a  $\pi$  ligand, which coordinates to the central atom  $M^1$ ; each  $A'$  is independently a divalent  $C_1$ - $C_{40}$  carbon-containing rest; each  $Z'$  is independently selected from boron, silicon, germanium or tin; each  $R^3$  is independently selected from hydrogen or a  $C_1$ - $C_{20}$  carbon-containing rest;  $o'$  is equal to 0, 1 or 2; each  $Hal$  is independently selected from a halogen atom;  $p'$  is equal to 1, 2 or 3.

5 10 2. A catalyst component according to claim 1, characterized in that the metallocene compound has formula:



(II)

wherein:

Y is halogen;

20 M is a transition metal of groups 3, 4, 5 or 6 of the periodic table; each L is independently selected from a cyclopentadienyl-type unity, including indenyl or fluorenyl, substituted or not and the substituents being equal or different, united to M through a  $\pi$  bond;

Q is an element of group 13, 14 or 15;

25 E is a spacer group that unites Q and Y and can have between 0 and 20 carbon atoms and between 0 and 5 oxygen, sulfur, nitrogen, phosphorus, silicon, germanium, tin or boron atoms and it is characterized by having in its skeleton at least one silicon, germanium or tin atom, which the substituent Y is united to;

30 R is an atom of hydrogen, halogen, halocarbon, substituted halocarbon,  $C_1$ - $C_{20}$  alkyl,  $C_2$ - $C_{20}$  alkenyl,  $C_6$ - $C_{20}$  aryl,  $C_7$ - $C_{40}$  alkylaryl,  $C_7$ - $C_{40}$  arylalkyl,  $C_8$ - $C_{20}$  arylalkenyl, alkoxy, siloxy and combinations thereof;

A, equal to or different from each other, is a bridge group between unities L and Q constituted either by only one divalent atom of group 16, preferably -O-, or by a trivalent monosubstituted element of group 15, preferably >N-R, R being defined above, or a tetravalent disubstituted element of group 14, preferably >C(R)<sub>2</sub> or >Si(R)<sub>2</sub>, R being defined above, or by a chain of 2 or 5 more atoms substituted or not, this chain being preferably of type -C-C-, -C-Si-, -Si-Si-, -Si-O-, -C-O, -C-N-, -C-C-C, -C-Si-C, -Si-O-Si-;

o is a number of value 0 or 1;

k is a number of value 1, 2 or 3;

10 m is a number equal to or higher than 2 and coinciding with the oxidation state of the transition metal;

p, n, l are numbers of value 0 or 1.

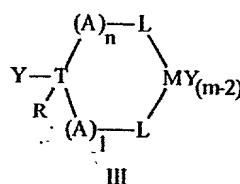
j is a number of value 0 or 1 with the condition that its value is 1 at least once; when J is 1 and o is 0, Q is a silicon, germanium or tin atom;

15 with the proviso that the compound does not have general formula

$X_m M^l (L' - M^2 (R^l R^2) - A' - Z' R^3_o . Hal_p)_n$ ,

wherein M<sup>l</sup> is a metal of group 4, 5 or 6 of the periodic table, each X is independently selected from hydrogen, halogen or a C<sub>1</sub>-C<sub>40</sub> carbon-containing rest; m<sup>l</sup> is equal to 1, 2 or 3; n<sup>l</sup> is equal to 1 or 2; each L' is independently a  $\pi$  ligand, which coordinates to the central atom M<sup>l</sup>; each M<sup>2</sup> is independently selected from silicon, germanium or tin; R<sup>l</sup> is a C<sub>1</sub>-C<sub>20</sub> carbon-containing group; R<sup>2</sup> is a C<sub>1</sub>-C<sub>20</sub> carbon-containing group or a  $\pi$  ligand, which coordinates to the central atom M<sup>l</sup>; each A' is independently a divalent C<sub>1</sub>-C<sub>40</sub> carbon-containing rest; each Z' is independently selected from boron, silicon, germanium or tin; each R<sup>3</sup> is independently selected from hydrogen or a C<sub>1</sub>-C<sub>20</sub> carbon-containing rest; o<sup>l</sup> is equal to 0, 1 or 2; each Hal is independently selected from a halogen atom; p<sup>l</sup> is equal to 1, 2 or 3.

20 25 3. A catalyst component according to claims 1-2, characterized in that the metallocene compound has formula:



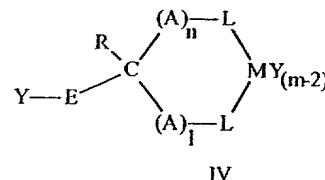
Wherein:

L, M, m, Y, R, l, n and A have already been defined;

T is selected from: silicon, germanium or tin.

4. A catalyst component according to claims 1-2, characterized in that the metallocene compound has formula:

5



wherein:

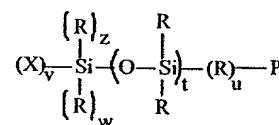
L, M, m, Y, R, E, I, n and A have already been defined;

10 T is selected from: silicon, germanium or tin.

5. A heterogeneous catalyst component for the polymerization of olefins obtained from an inorganic solid that contains hydroxy groups and a catalyst component according to claims 1-4.

6. A heterogeneous catalyst component for the polymerization of olefins according to claim 5 consisting of: an inorganic solid that contains hydroxy groups and that has been previously modified through reaction with a compound of formula:

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V

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being:

R: atom of hydrogen, halogen, halocarbon, substituted halocarbon, C<sub>1-20</sub> alkyl, C<sub>2-20</sub> alkenyl, C<sub>6-20</sub> aryl, C<sub>7-40</sub> alkylaryl, C<sub>7-40</sub> arylalkyl, C<sub>8-20</sub> arylalkenyl, alkoxy, siloxy and combinations thereof;

X: halogen or group OR<sup>4</sup> wherein R<sup>4</sup> has the same meaning given above;

P: NH<sub>2</sub>, NHR, SH, OH or PHR;

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v+z+w=3, v being different from 0;

t and u are comprised between 0 and 10:

and a catalyst component according to claims 1-4.

7. A heterogeneous catalyst component for the polymerization of olefins according to claims 5-6 characterized in that the inorganic solid is selected from the group comprising: silica, silicates, carbonates, phosphates, clays, metal oxides and mixtures thereof.

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8. A catalyst system comprising: a catalyst component according to claims 1-7 in combination with a cocatalyst selected from the group comprising: non-coordinating compounds of alumoxane-type, modified alumoxane-type, boron compounds and combinations thereof.

9. A catalyst system according to claim 8 characterized in that the cocatalyst is selected from the group comprising: methylalumoxane, dimethylaniline tetrakis(pentafluorophenyl)boron or tris(pentafluorophenyl)borane

10. A process for the preparation of the heterogeneous catalyst component characterized in that the compound of claims 1-4 and the inorganic support are put in contact by using tetrahydrofuran as solvent.

10 11. A process for the polymerization of alpha-olefins, optionally in combination with a cyclic olefin and/or a diene, characterized by the presence of a catalyst component according to claims 1-7.

12. A process according to claim 11 characterized in that the monomers are selected from the group comprising: ethylene, propene, 1-butene, 1-hexene, 4-methyl-1-pentene, 1-octene and mixtures thereof.

15 13. A process according to claim 11-12 for the copolymerization of ethylene in combination with a comonomer selected from the group comprising: propene, 1-butene, 1-hexene, 4-methyl-1-pentene, 1-octene, cyclic olefins and mixtures thereof.

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